Claims

[1]   A power saving mode control system of a base station in a wireless portable network system, comprising:

a message receiver for receiving a sleep mode request message from the subscriber station;

a message parser for parsing the sleep mode request message and extracting a minimum sleep interval, a maximum sleep interval, and a subscriber station identifier;

a grouping controller for determining a sleep mode entering time of the subscriber station which has requested the sleep mode based on the minimum sleep interval and the maximum sleep interval in order to group listening intervals of a plurality of subscriber stations and align them;

a memory for storing sleep mode information on the grouped subscriber stations; and

a message transmitter for reporting the minimum sleep interval, the maximum sleep interval, and the sleep mode enter time to the subscriber station which has requested the sleep mode.

[2]   The power saving mode control system of claim 1, further comprising:

a traffic receiver for receiving traffic from a network; and

a traffic transmission controller for buffering the traffic up to the listening interval of a subscriber station which will receive the traffic, and transmitting the traffic.

[3]   The power saving mode control system of claim 2, wherein the traffic transmission controller comprises:

a subscriber station identification unit for identifying the subscriber station which receives the traffic;

a buffer for buffering the traffic up to the listening interval of a subscriber station;

a traffic interval calculator for calculating a traffic transmission interval, cor-responding it to the identified subscriber station, and transmitting the same to the grouping controller; and

a traffic transmitter for transmitting the buffered traffic.

[4]   The power saving mode control system of claim 3, wherein the grouping controller updates the maximum sleep interval to correspond to the traffic

transmission interval by using the traffic transmission interval transmitted by the traffic transmission controller.

[5]   The power saving mode control system of claim 3, wherein the grouping controller selects a time wherein the remainder obtained by dividing the frame number by the maximum sleep interval align window size managed by the system corresponds to the minimum sleep interval, and determines the sleep mode entering time.

[6]   The power saving mode control system of claim 3, wherein the grouping controller determines the length of the listening interval on the grouped subscriber stations, and

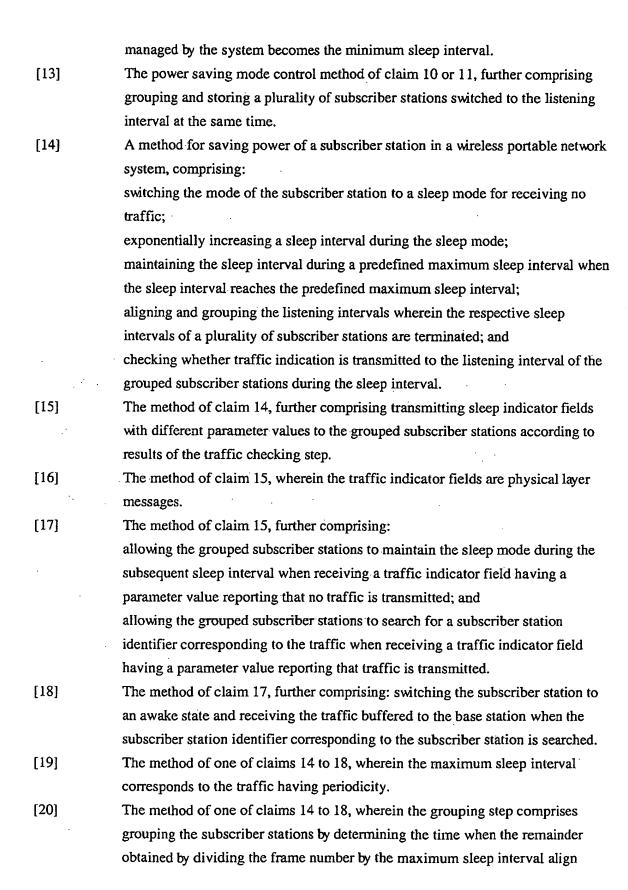the message transmitter reports the listening interval.

[7]   The power saving mode control system of claim 6, wherein the listening interval is established within the sleep interval.

[8]   The power saving mode control system of one of claims 1 to 7, wherein the sleep interval is exponentially increased from the minimum sleep interval to the maximum sleep interval.

[9]   A power saving mode control method in a wireless portable network system, comprising:

receiving a sleep mode request message from a subscriber station;

determining a minimum sleep interval and a maximum sleep interval of the subscriber station;

determining a sleep mode enter time based on the minimum sleep interval and the maximum sleep interval so that the listening interval of the subscriber station which has requested the sleep mode may be aligned and grouped with listening intervals of other subscriber stations; and

transmitting a sleep mode reply message including the minimum sleep interval, the maximum sleep interval, and the sleep mode enter time.

[10]   The power saving mode control method of claim 9, wherein the minimum sleep interval is determined based on the minimum sleep interval requested by the subscriber station.

[11]   The power saving mode control method of claim 10, wherein the maximum sleep interval is determined based on the interval of periodic traffic.

[12]   The power saving mode control method of claim 10 or 11, wherein the sleep mode enter time is determined to be a time when the remainder obtained by dividing the frame number by the maximum sleep interval align window size

managed by the system becomes the minimum sleep interval.

[13]   The power saving mode control method of claim 10 or 11, further comprising grouping and storing a plurality of subscriber stations switched to the listening interval at the same time.

[14]   A method for saving power of a subscriber station in a wireless portable network system, comprising:

switching the mode of the subscriber station to a sleep mode for receiving no traffic;

exponentially increasing a sleep interval during the sleep mode;

maintaining the sleep interval during a predefined maximum sleep interval when the sleep interval reaches the predefined maximum sleep interval;

aligning and grouping the listening intervals wherein the respective sleep intervals of a plurality of subscriber stations are terminated; and

checking whether traffic indication is transmitted to the listening interval of the grouped subscriber stations during the sleep interval.

[15]   The method of claim 14, further comprising transmitting sleep indicator fields with different parameter values to the grouped subscriber stations according to results of the traffic checking step.

[16]   The method of claim 15, wherein the traffic indicator fields are physical layer messages.

[17]   The method of claim 15, further comprising:

allowing the grouped subscriber stations to maintain the sleep mode during the subsequent sleep interval when receiving a traffic indicator field having a parameter value reporting that no traffic is transmitted; and

allowing the grouped subscriber stations to search for a subscriber station identifier corresponding to the traffic when receiving a traffic indicator field having a parameter value reporting that traffic is transmitted.

[18]   The method of claim 17, further comprising: switching the subscriber station to an awake state and receiving the traffic buffered to the base station when the subscriber station identifier corresponding to the subscriber station is searched.

[19]   The method of one of claims 14 to 18, wherein the maximum sleep interval corresponds to the traffic having periodicity.

[20]   The method of one of claims 14 to 18, wherein the grouping step comprises grouping the subscriber stations by determining the time when the remainder obtained by dividing the frame number by the maximum sleep interval align

window size managed by the system becomes the minimum sleep interval, as the subscriber station's sleep mode enter time.